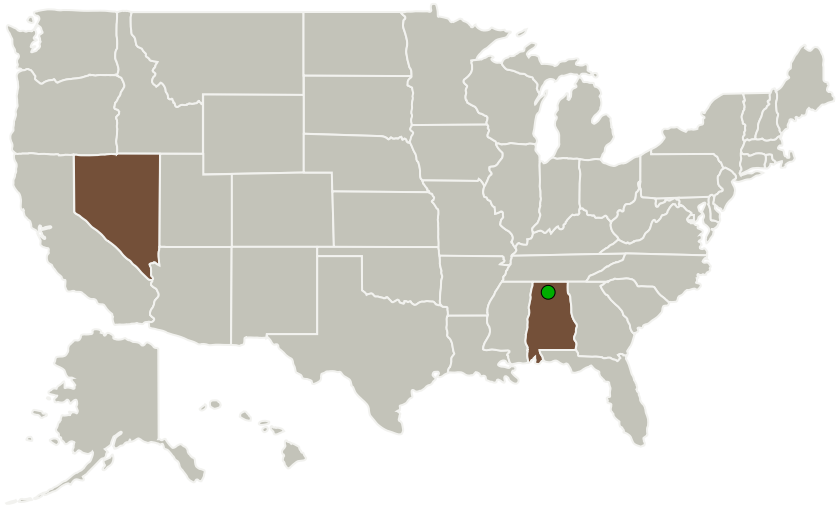
A Green, Safe, Dual-Pulse Solid Motor for CubeSat Orbit Changing, Phase I

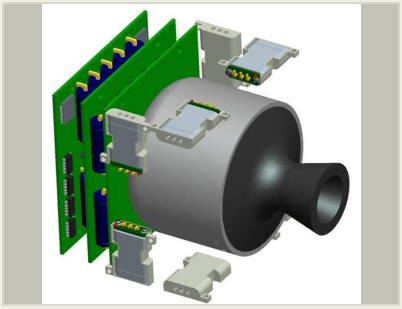
Completed Technology Project (2014 - 2014)

Project Introduction

Small satellites such as CubeSats are in need of responsive propulsion, but are limited due to their size. Though single pulse, AP/HTPB fueled solid rocket motors exist in the market, greater mission flexibility is to be had from a motor with the capability of a second ignition in the same volume constraints. Digital Solid State Propulsion (DSSP) proposes research into the technology to not only to enable a second pulse from a high thrust solid rocket motor, but also into a safer class of propellants called Electric Solid Propellants (ESPs). A barrier system, developed on other DSSP programs, would be the stepping stone for the dual pulse ability of the motor. The ESPs are a group of propellants that are electrically ignited, but safer to handle compared to standard solid energetic propellants. For in-space use, Aluminized variant of ESP would be improved and utilized for this application. Phase I funding would allow for the advancements of these technologies to a TRL 3. Then following basic research and design goals of a Phase I contract, a Phase II contract would allow the design and test of an integrated Delta-V and ACS propulsion into a 1U module at TRL 6.

Primary U.S. Work Locations and Key Partners





A Green, Safe, Dual-pulse Solid Motor for CubeSat Orbit Changing Project Image

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Organizations Performing Work	Role	Type	Location
Digital Solid State Propulsion Inc.(DSSP)	Lead Organization	Industry	Reno, Nevada
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Nevada

Project Transitions

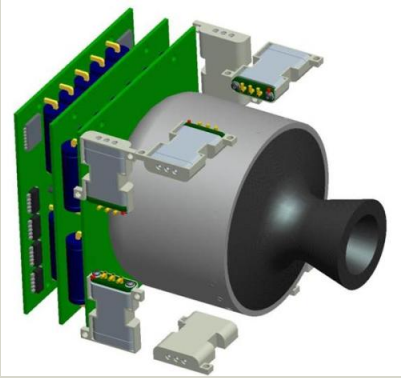
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140745)*

Images



Project Image
A Green, Safe, Dual-pulse Solid Motor for CubeSat Orbit Changing Project Image
(https://techport.nasa.gov/image/133370)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Digital Solid State Propulsion Inc. (DSSP)

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

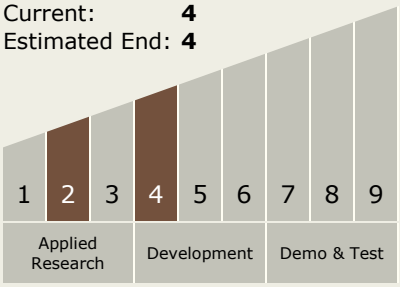
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Tim Manship

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.4 Solids

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System